attempt has been made to render the descriptions as little obtuse as possible, so that they may be of interest to sportsmen as well as to scientific naturalists, to the former of whom the Ungulates are of special interest.

Recent minute study and careful comparison of specimens has led to such multiplication of species that new arrangements of them are unavoidable. In most modern works an attempt is made to group the known forms by instituting new and narrower genera which are often identical with old-time species. Mr. Lydekker attempts to attain the same end by classing nearly-related forms as races of a single species. We are not sure that we approve of this method, which involves a greater use of trinomials, where binomials would often suffice, and is, we think, a hopeless struggle against modern tendencies. In the case of the musk-oxen this practice gains nothing; nor does it seem a great advantage to grade all the sheep inhabiting the North American continent as subspecies of *Ovis canadensis*. In other respects we have nothing but praise for a work which will certainly be valued by those for whom it is intended.

THE SCIENCE OF FORESTRY.

(1) *The Theory and Practice of Working Plans* (*Forest Organisation*). By Prof. A. B. Recknagel. Pp. xii+235+6 plates. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1913.) Price 8*s*. 6*d*. net.

(2) *The Important Timber Trees of the United States: A Manual of Practical Forestry*. By S. B. Elliott. Pp. xix+382+plates. (London: Constable and Co., Ltd., 1913.) Price 10*s*. 6*d*. net.

(3) *A Handbook of Forestry*. By W. F. A. Hudson. Pp. ix+82. (Watford: The Cooper Laboratory, n.d.) Price 1*s*. 6*d*. net.

THE output of forestry literature in America is becoming remarkable. In addition to several admirable periodical publications like the *Forest Quarterly* and the Proceedings of the Society of American Foresters, as well as the numerous bulletins, circulars, and miscellaneous works issued by the Forest Service at Washington, there are constantly appearing now useful text-books on the different branches of the science of forestry. These are especially valuable to us, as, with the exception of the standard works of Nisbet and Schlich, which are necessarily limited and stereotyped in scope, scarcely any serious books on forestry have appeared of late years in England. In arboriculture, which is the study of individual trees, on the contrary, English writers still keep up the tradition of Loudon and are in the first rank.

(1) Forest organisation is the subject of an excellent book by Prof. Recknagel, of Cornell University. The works in English on this important branch of forestry hitherto available have been practically two only, Schlich's "Manual," vol. iii., somewhat limited in scope, and D'Arcy's "Working Plans," confessedly confined to Indian practice. We have had no treatise which gave a general discussion of the subject. The merit of Prof. Recknagel's work is the clear and concise way in which he treats of the different methods of estimating the yield of the forest, and the ample details which he gives concerning the modes of management in Germany, Austria, France, and the United States. The author agrees with Schlich in considering that Judeich's method is the most rational of the seventeen methods described for determining the yield, *i.e.*, of calculating the actual amount of timber that should be cut annually in a forest, which is worked so as to give a constant annual return. This method, with obvious simplifications, can be adapted to ordinary estates in England, on which there is a considerable area of woods of different ages. On p. 53, line 9, there is an obvious error: 49,000 should read 24,500.

(2) It is significant of the depletion of the timber supplies of the United States that numerous books are now being published there which deal with the formation of new woods by planting methods. The latest of these, by Mr. Elliott, is designed for the use of private landowners in America. The first part (pp. 1–129) deals with the ordinary details of sylviculture, and contains nothing novel, though the account of nursery work, as it is carried on in Pennsylvania, with illustrations of the State Forest Nursery, is of considerable interest.

The second part of the book (pp. 130–357) is a description of the important timber trees which are suitable for planting for profit in North America. There is scarcely any information in this which will be of much service to English foresters, as the author's experience is mostly drawn from the eastern part of the United States, while for us it is the Pacific Coast trees that are of value. His knowledge of the latter is limited, as evidenced by the perfunctory way in which the Douglas fir is treated, and the omission of the Sitka spruce. The statement that "one who purchases Western hemlock believing it to be Oregon pine is not much wronged" is quite erroneous. The latter tree (*Pseudotsuga Douglasii*) is, of course, much superior to the hemlock, both in rate of growth and in the quality of the timber

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produced. The account of the cultivation in America of Scots pine, European larch, and Norway spruce is of considerable interest. All three grow well for a time, but never make good trees in the eastern parts of the United States.

(3) The "Handbook of Forestry," which has been issued by the Cooper Laboratory at Watford, is inconvenient to handle, being a thin folio of 82 pages, with 25 illustrations of very unequal merit. While generally sound in regard to practice, it contains nothing that has not been said before in several small, handy text-books, and is startling in its omissions. While the London plane is included as a forest tree, the Corsican pine, which is the most valuable of its genus for many soils and situations, is omitted. In the chapter entitled "conditions affecting growth" nothing is said about the important questions of altitude, exposure to wind, situation near the sea or inland, and latitude, all important factors influencing the choice of species and the formation of new plantations. The "Black Poplar" (*Populus nigra*) is correctly drawn; but in the description it is confused with the "Black Italian Poplar" (*Populus serotina*), the fast-growing hybrid tree, which should always be planted in preference to the former, when timber is required.

Such statements as (p. 64) that the lime is not indigenous, and names like *Tilia magnifolia*, show that the author is not well acquainted with forest botany. The two native birches are distinguished by drawings, but nothing is said of their very different soil-requirements.

OUR BOOKSHELF.

Practical Stone Quarrying: a Manual for Managers, Inspectors, and Owners of Quarries, and for Students. By A. Greenwell and Dr. J. Vincent Elsden. Pp. xx+564. (London: Crosby Lockwood and Son. 1913.) Price 12*s.* 6*d.* net.

WHEN our hard-headed forbears were roving Piltdown, the art of the quarryman could scarcely have been in its infancy; yet we have far to travel in the mazes of the past if we must find its beginnings, and the work of some of the early masters of the craft still remains to excite our wonder. From the nature of the material ancient methods were very like our own, and probably differed mainly in speed.

Old though the art may be we are still in doubt as to what a quarry is; most likely the ancient quarryman was not troubled with this question, but now, what with Acts of Parliament, judicial embellishments, and the sanction of custom, it has become impossible to define "quarry." The authors of this volume have made a brave effort to clear up the confusion; it is very interesting, but scarcely successful. They have had almost as much difficulty with "stone"; however, by including some "mines" among the quarries and omitting to take account of some materials which would come under their own definition of stone, they have succeeded in producing an eminently satisfactory book on the subject, one for which there was a real need.

After an adequate discussion of the occurrence of stone, the distribution of quarries in the United Kingdom, and divisional planes in rocks, there follows some excellent advice on the location of quarries and their proper development, a subject of the greatest importance.

A large amount of space is devoted to methods of extraction, tools, blasting, cableways, and haulage systems. The table, p. 300, giving the amounts of different explosives used in the United Kingdom, would have been more valuable if the explosives had been classified according to the kind of rock and the uses of the stone.

A short chapter treats of the preparation of stone for the market, another with the dangers of quarrying, and the book concludes with some remarks on quarry legislation which may be commended to the notice of those in authority. The volume is very well illustrated, and there is a fair index.

The Microtomist's Vade-Mecum. A Handbook of the Methods of Microscopic Anatomy. By A. B. Lee. Seventh edition. Pp. x+526. (London: J. and A. Churchill, 1913.) Price 15*s.* net.

WE gladly welcome the new edition of this work which has become indispensable in all laboratories of biology. The general plan and the size of the book remain unaltered, but the author has managed by judicious "pruning," and some exclusion of out-of-date matter, to introduce much new matter, more than seven hundred additonal entries appearing in the index.

Goldmann's *intra-vitam* staining methods, and improvements in the silver fibril stains of Bielschowsky and Ramón y Cajal are detailed. Gibson's new mounting media, which dispense with the use of clearing agents, and confer on unstained or feebly stained objects just the required degree of visibility, are described. The sections relating to the blood and blood parasites have been rewritten. Not the least useful part of the contents are the full references given to the literature of the subject. Those who have worked with former editions will find that the present one maintains in all respects the high standard of its predecessors. R. T. H.

Astronomy Simplified. By Rev. Alex. C. Henderson. (London: James Clarke and Co., 1913.)

THE object of this book is, as the author states, "to extend a knowledge of the sublimest of the sciences," and he intentionally reminds the reader many times throughout the pages that while man is striving to find out the laws which govern the behaviour of matter in space, there is a greater

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